GREENWOOD RAILROAD BRIDGE
Post Road (US Route 1) and Main Avenue over New Haven Railroad
Warwick
Kent County
Rhode Island

HAER No. RI-49

HAER,
RI,
2-WAR,
2-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD

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Location: Post Road (U.S. Route 1) and Main Avenue over New Havan Railroad
Warwick
Kent County, Rhode Island

USGS Quadrangle: East Greenwich, RI UTM: 19.296290.4620400

Enginaar/Architect: Rhode Island State Board of Public Roads

Fabricator: Boston Bridga Works

Data of Construction: 1930

Present Owner: Stata of Rhode Island Department of Transportation
2 Capitol Hill
Providence, RI 02903

Prasent Use: active highway bridge

Significanca: Tha Greenwood Railroad Bridge is significant as an axample of the standardized approach to concrete bridge design and replacement initiated by Rhode Island Bridge Engineer Clarance L. Hussey during the 1920s, end is also significent as a well-preserved example of eerly twntieth-century hybridized bridge construction. The Greenwood Railroad Bridga is also evidence of the creation of, and improvaments to, Rhode Island's state highway transportation system, as well as railroad-related highway improvemants, brought about by tha emergence of the automobile and the growth of the urban environment.

Project Information: The National Railroad Passengar Corporation (Amtrak), in association with the Federal Railroad Administration (FRA), is proposing a number of infrastructure projects to upgrada the Northeast Corridor Railroad right-of-way in Connecticut, Rhode Islend, and Massachusatts. In consultation with the State Historic Preservation Officers (SHPOs), Amtrak and FRA have determined that the proposed "Northeast Corridor Improvement Project —Electrification: New Haven, Connecticut to Boston, Massachusetts" project will have adverse impacts on significant historic properties. Three memoranda of agreement outlining stipulations to eliminate, minimize, or mitigate adverse project impacts have been drafted by Amtrak, the FRA, and the respectiva SHPOs, and have been accepted by the Advisory Council on Historic Preservation. The stipulations include the racordation of the Greenwood Railroad Bridge to Historic American Engineering Record standards.

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210 Lonsdale Avenue
Pawtucket, Rhoda Island 02860

PART I DESCRIPTIVE INFORMATION

Tha Greenwood Railroad Bridge is locatad in a mixed commercial-residential area south of the city of Providence in Warwick, Rhode Islend and carries U.S. Route 1 and Main Street over the Amtrak Northeast Corridor at Milepost 175.61.

The Greenwood Railroad Bridge is e 13B-foot, steel-and-concrete, multi-beam bridge consisting of three spans: a 66-foot central, main treck span, and two 36-foot approach spans. The bridge is oriented at a 60-degree skew to the reilroad tracks. The total length of the bridge, including the epproech walls, is 192 feet. The bridge deck has an overall width of 70 feet including railings, and the roadway is 50 feet wide between curbs, which guard eight-foot sidewalks on each side of the roed. The spans rest on two full-width, solid, reinforced concrete pier wells located eithar side of the two reilroed tracks with a horizontal clearance of 57 feet. The piers include 9-foot long remped collision posts at their beses. As built, the bridge hed 1B feet of cleerence ebove the rail, e distance that has been increased since the time of original construction. The main span consists of 17 steel members: 15 parallel, built-up, riveted, steel plate girders encased in concrete, cast integrelly with the B-inch thick reinforced concrete deck sleb; end 2 outer fescie girders encased within the concrete perepet railings. The two approach spans each consist of 16 reinforced concrete T-beems thet are integrally cest with the concrete deck. This structure is integrally cast with the ebutments and piers to form a continuous rigid frame. The center span girders are supported on the piers, and rest on expansion joints located in the interstices between the epproech span T-beems. The abutments consist of reinforced concrete bents on spread footings. The approech wells and abutments ere filled with grevel.

The decorative scheme on the bridge is spara. The bottom edges of the outer fascia include slight brackets where they meet the piers. The bare concrete surface of the bridge is rubbed smooth, with rectanguler, bush-hammared panels on the parapet railing end piers. Eech reiling contains three recessed panels in the approech spans and five in the center span. Three large, flush panels are located on the piers. The parepets elso include a simple cest railing and end posts. The end posts include blue-on-white enemel identification tiles containing the bridge name, number, contractor, and responsible state agency, the Rhode Islend Board of Roads end Bridges.

PART II HISTORICAL INFORMATION

The Greenwood Railroad Bridge in Warwick, Kant County, Rhode Islend, spans the Netional Railroed Passenger Corporation (Amtrak) Northeest Corridor, a high-speed passenger reil line thet connects Boston, New York City, Baltimore, end Washington, D.C. This route originelly consisted of severel passenger and freight railroads with end-to-end-connections, which ware consolidated into the Amtrak system in 1971. The segment of the Northeast Corridor that includes the Greenwood Railroad Bridge was originally chertered in 1B32 es the Providence and Stonington Railroad. Construction began in 1B32, and in 1B33 the railroed merged with severel new Connecticut end Massachusetts railroeds to form the New York, Providence and Boston, or the "Stonington Road". This reilroed, elong with the Boston end Maine end the Boston end Worcester wes one of the first three mejor railroeds in New Englend. The Providence-to-Stonington segment that includes the Greenwood Railroed Bridge was surveyed by Major George Washington Whistler, noted railroad surveyor end father of the painter James McNeill Whistler. In 1B92 the Boston to New York line wes included in the growing New York, New Havan & Hartford Railroad (New Havan) system. Through rail connection to New York City was not realized until the Thames River at Groton, Connecticut, was finally bridged in 1BB9 (Karr 1995:124–126).

The Greenwood Railroad 8ridge, also known as Rhode Island Department of Transportation (RIDOT) Bridge Number 2, is a component of a massive roads-and-bridges program undertaken by tha Rhode Island Stata 8oard of Public Roads in the 1920s and 1930s. This program included a new state highway system, improvemant of linking roads, and raplacement of obsolascent bridges (Clouatta and Roth 1985:32-33). The Greenwood Railroad 8ridge was a component of a Post Road (U.S. Routa 1) improvaments program, as wall as a cooparativa grada crossing elimination projact involving the Naw York, New Havan & Hartford Railroad (New Haven Railroad). Under tha Rhode Island–Naw Havan project agreemant, stata road improvemant funding was augmented by federal aid, and the railroad paid for the cost of tha primary staal work and one-third of the construction costs exclusiva of paving. Rhode Island was ona of first statas to advance federal grade crossing elimination funds to tha construction phase. The cooperative agreement also stipulated that all bridges be dasigned to accommodate four tracks undar their central spans, with spaca for ona future additional track undar each approach span. Tha bridge decks were also designad so that the sidewalks could be narrowed to accommodate additional futura traffic lanas (State of Rhode Island 192B:99, 1929:84, 1930:81).

The Naw Haven Railroad approved the Graanwood Railroad Bridge clearancas and design on June 10, 1929. The construction contract for the bridga, Fedaral Aid Projact No. 44-A, was awardad in Novembar 1929 to East Providence, Rhoda Island contractor, Joseph McCormick, whosa bids of $47,000 for the bridga structura and $29,000 for tha construction of the approaches were tha lowest of tha 19 proposals submittad. In Fabruary of 1929 a temporary timber bridga was aracted north of the prasent structura to carry highway traffic whila construction was in progress. Tha staal girders and trusses for the new Greenwood Railroad 8ridge wera fabricatad by tha Boston Bridga Works, which submittad the low steal work bid of $15,922. Founded in 1876, tha Boston Bridge Works dominatad New England manufacturing of bridgas, staal-framed buildings, and larga spacializad structuras including cranas and railroad turntablas until 193B (Clouette 1991:5–6). The major staal componants wara delivared by rail to tha nearby Hillsgrove rail siding, and moved to the bridga site and aracted by the New Havan Railroad. Construction bagan Decamber 11, 1929, and one lana of traffic was opened on August 6, 1930. The bridga was completed on September 15, 1930 at a total cost of $134,3B1.85, of which tha Naw Haven Railroad paid $35,000 (Stata of Rhoda Island 1930:81–83, 1931:115–116).

The Graanwood Railroad Bridge, which combinas both Malan- and rigid-frama construction, is significant as a wall-prasarved exampla of hybridized standard bridga construction types from tha aarly twentieth century. The main span is derivative of the Melan systam, patantad by Josaph Melan for arch bridges in 1894 and adaptad to straight spans by F.W. Pattarson of Pittsburgh in 1898. In this design, main bridga spans ara supportad by rivated, built-up steal girders or trusses antiraly encased in concrata. By 1905 bridga engineers had determined that strategically-located convantional bar rainforcamant was adequata to withstand tansile stressas. The Malan encasad-girdar configuration was considared radundant, as the steel mambars wara actually capable of carrying daad and live loads on thair own, and tha concreta sarved no structural function (Condit 1961:195–218). Tha approach spans of tha Graenwood Railroad 8ridga ara of rigid-frame construction, and "consist of [concrate T-] beams which are connected by spacially-designad reinforcament steal with the pier and abutment bants to form rigid framas" (Stata of Rhode Island 1931:115). This cost-saving, wholly-rainforced, rigid-frama concreta bridga dasign bacame popular aftar World War I and was first usad on a larga scala in the 74 bridges of Arthur G. Hayden's Wastchastar Expressway in Naw York (Hayden 1931:1–4). This continuous-form structura was particularly adaptabla to highway arches and ancouragad tha use of comprahensiva axternal dacorative schames. It was extansively amployed in tha construction of the Marritt Parkway in Connecticut, as well as tha Hunt River and Main Streat bridgas.

The Greenwood Railroad Bridge is similar in eppearance and construction to several other concrete highwey bridges arected by tha Bridge Depertment of the Rhode Island Stata Boerd of Public Roads over the New York, New Haven & Hartford Railroad right-of-way in Rhode Island during the 1930s, including the Main Street Bridge, South Kingstown (HAER RI-47), and the Hunt River Road Bridge, Warwick (HAER RI-48). Rhode Islend's highway bridge improvemant program began in 1912 with the formation of a separate bridge division within the Rhode Island State Board of Public Roads. The bridge division's director, Clerence L. Hussey (1885–1925), was Rhode Island's first bridge engineer. Hussey wes a nationelly-prominent bridge engineer noted for his originel contributions to the construction of concrete arch bridges and concrete engineering technology, including an elegant, cost- and weight-saving, modified-spandrel, concrete-arch bridge design (Henderson 1926:1632–1633, Providence Sunday Journal 1925:3). Under Hussey, the bridge division utilized standardized plens for bridge replacement and selected concrete for the major bridge building material due to its strength, longevity, and low maintenance requirements, as well as ease of construction. This factor encouraged the use of local contractors (Clouette and Roth 1988:31). These bridges also included standardized features such as bush-hammered, rectengular, decorative panels located so as to mask joints, and blue-on-white glazed porcelain tiles at the perapet railing ends that indicete the bridge name, number, contractor, and responsible state agency, the Board of Public Roads.

The unusual combinetion of a monolithic, Melan-type concrete-encased, steel plate girder with an integrally cast deck, and rigid-frame, reinforced, concrete T-beam construction for the approach spans, piers, and abutments was developed for the Greenwood Railroad Bridge as it "provided a convenient method of supporting the concrete floor forms without independent centering supports that would have been very complicated due to the clearance required for railroad operations" (State of Rhode Island 1931:115). This hybrid variation was a solution to logistical constraints rather than a true engineering innovetion. The Greenwood Reilroed Bridge is one of 318 steel stringer/multi-beem or girder stael-end-concrete bridges constructed in Rhode Islend between 1900 and 1991. This group of bridges demonstrates the versetility of multi-beam bridge construction in Rhode Island during the twentieth century. Only 33 of these bridges were built before 1945, with the first of the collaborative railroad grade crossings built at Summit, Rhode Island in 1927, meking the Greenwood Railroad Bridge a relatively early local example of the type (Adams and Tait 1994).

PART III SOURCES OF INFORMATION

A. Plans and Drawinga

Rhode Island Depertment of Trensportetion, Plan Room.

B. Historic Viewa

Rhode Island Department of Transportation. View of west elevation ca. 1937. Clarence Hussey Bridge Photograph Collection photograph no. 2046.

C. Bibliography

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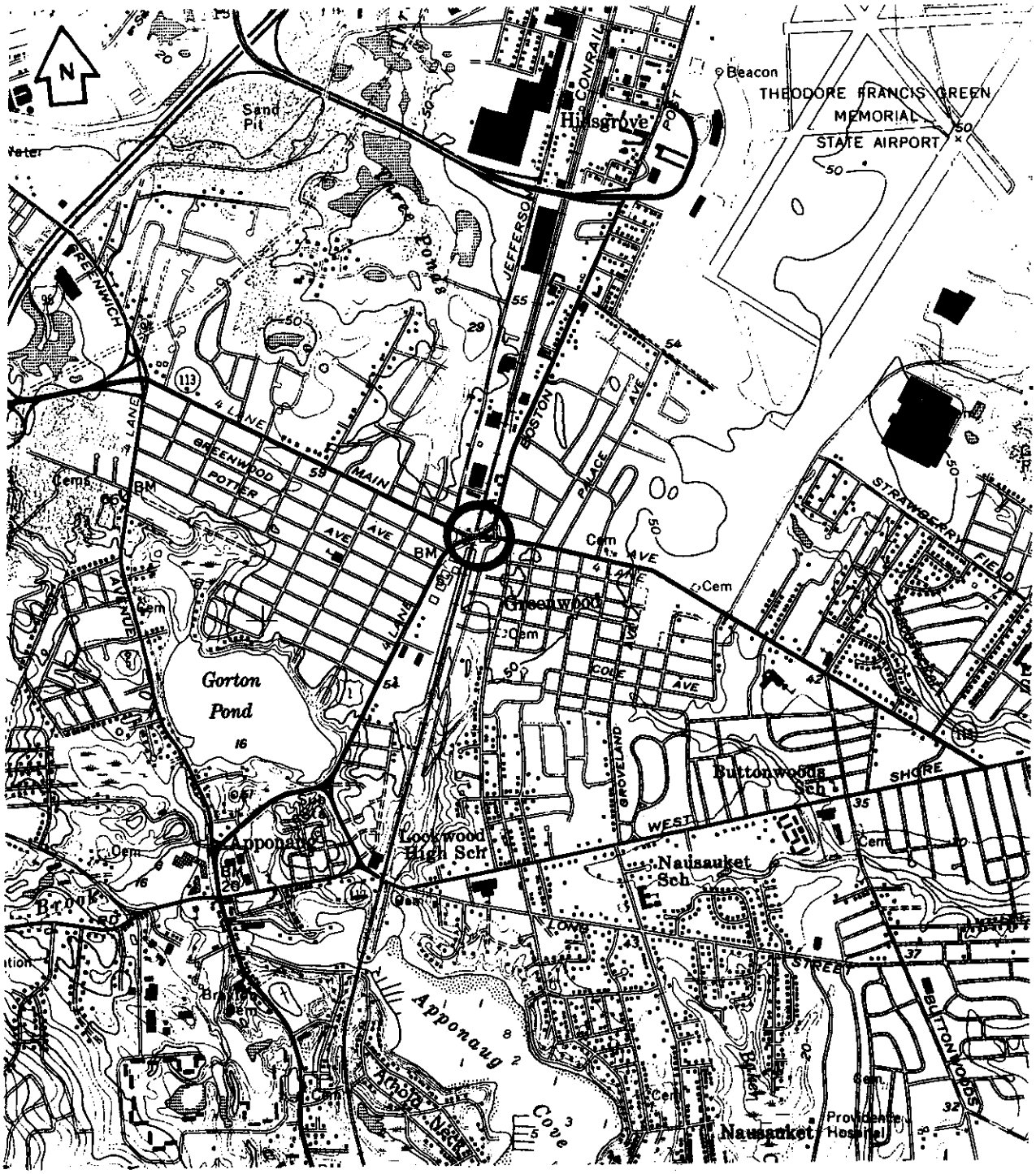
D. Interviews

Nona conducted

Location Map



Source: USGS Quad: East Greenwich, RI